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MATHEMATICAL PHYSICS.—*Appell's equations.*[1] R. J. SEEGER, The George Washington University. (Communicated by EDGAR W. WOOLARD.)

Appell's equations[2] describe the motion of a dynamic system. Their use involves two advantages of theoretical importance: The mathematical one of applicability to both holonomic and nonholonomic systems (such as do or do not have integrable relations connecting the coördinate-velocities); the physical one of immediate expressibility in terms of accelerations (*cf.* the methods of Lagrange and of Hamilton which start with coördinates and velocites). However, the significance of the latter seems to be wholly superficial upon closer examination of the usual derivation of the equations.[3] For the basis is Lagrange's formulation of D'Alembert's principle—virtually a reduction of the dynamical problem to a statical one. Although this is a virtue in the light of practicability, it is logically vicious. Gibbs[4] has remedied this defect of the standard equations of motion by the postulation of a formula involving "geometric" accelerations instead of the ordinary "geometric" displacements. (It is to be remembered that all such variations are mathematical inventions—not physical ones.) Moreover, he has shown his expression to be a more complete and a more accurate description of the laws of motion than the previous one. The question arises as to whether Appell's equations can be derived on such a basis. We shall now consider this point. And, incidentally, the relativistic form of the equations on the Special Theory will be given.

[1] Received September 20, 1930.

[2] P. APPELL. *Sur une forme général des équations de la dynamique.* (*Memorial des sciences mathematiques*). Paris, 1925.

[3] J. S. AMES and F. D. MURNAGHAN. *Theoretical mechanics*, page 329. 1929.

[4] J. W. GIBBS. *On the fundamental formulae of dynamics.* Am. Jour. Math. 1879: 49.

Suppose we have a dynamic system composed of m particles and possessing n degrees of freedom. Also, in addition to the r distinct generalized coördinates there are s superfluous ones. All these are bound together by k relations of the following form:

$$\sum_{\alpha=1}^{r} a_{\alpha\beta}\, dq_\alpha + \sum_{\alpha=r+1}^{r+s} p_{\alpha\beta} + b_\beta\, dt = 0 \quad \beta = 1 \ldots k \qquad (1)$$

where $a_{\alpha\beta}$ and b_β are functions of the coördinates q_α and the time t and where $p_{\alpha\beta}$ represent linear, differential functions of the same. Hence, $n = r + s - k$. This equation indicates the type of the system: holonomic if s can be made equal to k, non-holonomic if s must be less than k, (unsolvable for $s > k$)

First we set up Gibbs' equation in relativistic form for the Cartesian coördinates of the particles:

$$\sum_{i=1}^{m} \sum_{j=1}^{3} \left[X_{ij} - \frac{d}{dt} (M_{ij}\, \dot{x}_{ij}) \right] \delta\, \ddot{x}_{ij} = 0 \qquad (2)$$

where the symbols have their usual meanings. In order to transform this expression into one involving the generalized coördinates only, we make use of certain relations (that must be given) of the following type:

$$x_{ij} = x_{ij}\,(q_1 \ldots q_{r+s}, t)$$

Hence,

$$\delta\, \ddot{x}_{ij} = \sum_{\alpha=1}^{r+s} \frac{\partial\, \ddot{x}_{ij}}{\partial\, q_\alpha}\, \delta\, q_\alpha + \sum_{\alpha=1}^{r+s} \frac{\partial\, \ddot{x}_{ij}}{\partial\, \dot{q}_\alpha}\, \delta\, \dot{q}_\alpha + \sum_{\alpha=1}^{r+s} \frac{\partial\, \ddot{x}_{ij}}{\partial\, \ddot{q}_\alpha}\, \delta\, \ddot{q}_\alpha + \frac{\partial\, \ddot{x}_{ij}}{\partial\, t}\, \delta t$$

But the validity of equation (2) is conditioned by the vanishing of both δq_α and $\delta \dot{q}_\alpha$ at a given instant. Thus we obtain

$$\delta\, \ddot{x}_{ij} = \sum_{\alpha=1}^{r+s} \frac{\partial\, \ddot{x}_{ij}}{\partial\, \ddot{q}_\alpha}\, \delta\, \ddot{q}_\alpha \qquad (3)$$

not all the $\delta \ddot{q}_\alpha$ are independent. Therefore we must consider the modification in (3) due to equations (1). The independence of the latter and their linearity enable us to solve for k of the coördinate-differentials, which can then be expressed linearly in terms of the remaining ones. Denoting the coördinates by Q_α after such a procedure, we have

$$dQ_\beta = \sum_{\gamma=1}^{n} A_{\beta\gamma}\, dQ_{k+\gamma} + B_\beta\, dt \quad \beta = 1 \ldots k$$

Subjecting the variations to the same conditions as above, we obtain

$$\delta\dot{Q}_\beta = \sum_{\gamma=1}^{n} A_{\beta\gamma}\, \delta\ddot{Q}_{k+\gamma} \quad \beta = 1 \ldots k$$

We now substitute these $\delta\ddot{Q}_\beta$ in (3). Hence,

$$\delta\, \ddot{x}_{ij} = \sum_{\gamma=1}^{n} C_{ij\gamma}\, \delta\ddot{Q}_{k+\gamma} \tag{4}$$

and equation (2) becomes

$$\sum_{i=1}^{m}\sum_{j=1}^{3}\left\{\left[X_{ij} - \frac{d}{dt}(M_{ij}\,\dot{x}_{ij})\right]\sum_{\gamma=1}^{n} C_{ij\gamma}\,\delta\ddot{Q}_{k+\gamma}\right\} = 0 \tag{5}$$

or

$$\sum_{\gamma=1}^{n}\left\{\sum_{i=1}^{m}\sum_{j=1}^{3}\left(\left[X_{ij} - \frac{d}{dt}(M_{ij}\,\dot{x}_{ij})\right]C_{ij\gamma}\right)\right\}\delta\ddot{Q}_{k+\gamma} = 0$$

But the $\delta\ddot{Q}_{k+\gamma}$ are arbitrary. Therefore

$$\sum_{i=1}^{m}\sum_{j=1}^{3}\left(\left[X_{ij} - \frac{d}{dt}(M_{ij}\,\dot{x}_{ij})\right]C_{ij\gamma}\right) = 0 \quad \gamma = 1 \ldots n \tag{6}$$

These are the equations of motion.

As a matter of secondary interest, we shall now express these relations in a more compact—but less convenient—form. For

$$\sum_{i=1}^{m}\sum_{j=1}^{3}\left[\frac{d}{dt}(M_{ij}\,\dot{x}_{ij})\,C_{ij\gamma}\right] = \sum_{i=1}^{m}\sum_{j=1}^{3}\frac{M_{io}}{\left[1 - \left(\frac{\dot{x}_{ij}}{c}\right)^2\right]^{3/2}}\,C_{ij\gamma}\,\ddot{x}_{ij}$$

where M_{io} is the rest-mass and c is the velocity of light.

But $\dot{x}_{ij}$ can be written

$$\dot{x}_{ij} = \sum_{\gamma=1}^{n} C_{ij\gamma}\,\dot{Q}_{k+\gamma} + C_{ij} \tag{7}$$

where C_{ij} represents the terms due to the explicit dependence on the time.

Likewise

$$\ddot{x}_{ij} = \sum_{\gamma=1}^{n} \dot{C}_{ij\gamma} Q_{k+\gamma} + \sum_{\gamma=1}^{n} C_{ij\gamma} \ddot{Q}_{k+\gamma} + \dot{C}_{ij} \tag{8}$$

From (7) we conclude that $\dfrac{M_{io}}{\left[1-\left(\dfrac{\dot{x}_{ij}}{c}\right)^2\right]^{3/2}}$ is not a function of $\ddot{Q}_{k+\gamma}$.

And from (8) we note that $C_{ij\gamma}$ can be regarded as $\dfrac{\partial \ddot{x}_{ij}}{\partial \ddot{Q}_{k+\gamma}}$ (the derivative being purely formal). Let

$$\Gamma_\gamma \equiv \sum_{i=1}^{m} \sum_{j=1}^{3} X_{ij} C_{ij\gamma}$$

and

$$\Lambda \equiv \sum_{i=1}^{m} \sum_{j=1}^{3} \tfrac{1}{2} \frac{M_{io} \ddot{x}_{ij}^2}{\left[1-\left(\dfrac{\dot{x}_{ij}}{c}\right)^2\right]^{3/2}}$$

Then

$$\Gamma_\gamma = \frac{\partial \Lambda}{\partial \ddot{Q}_{k+\gamma}} \qquad \gamma = 1 \ldots . n \tag{9}$$

These equations can be identified with those of Appell for the non-relativistic case by a consideration of coördinate-velocities small with respect to the velocity of light. For, our Λ then reduces to his "energy of the accelerations."

BOTANY.—*The genus* Trichanthera.[1] EMERY C. LEONARD, U. S. National Museum. (Communicated by E. P. KILLIP.)

Until recently the genus *Trichanthera* of the Acanthaceae family was known from a single species, *T. gigantea*. It was fully described and finely illustrated by Humboldt and Bonpland as early as 1809[2] but was placed by them in the genus *Ruellia*. Their uncertainty as to the correctness of this course of action is shown by their remarks—"La plante que je viens d'écrire se trouve bien placée parmi les Acanthes;

[1] Published by permission of the Secretary of the Smithsonian Institution. Received September 3, 1930.

[2] Pl. Aequin 2: 68. 1807.

mais il n'est pas facil de la rapporter à un des genères connus de cet ordre, ou d'en établir un nouveau qui offre des charactères bien tranchés. Dans cette incertitude, j'ai préferé la rapporter au genère Ruellia, plutôt que d'en établir un nouveau. Je donne à cette nouvelle plant le nom de Ruellia gigantea, parce que c'est un arbre très élevé."

The name *Trichanthera* was introduced ten years later when Kunth redescribed[2] this well-marked species and added the following observation, "Certe distincti generis ob stamina exserta, antheras pilosas et capsulae loculos dispermos. Fortasse Trichanthera nominandum."

In the present paper two species and one variety are described. These consist of attractive large-leaved shrubs or trees with silky reddish flowers crowded in terminal racemes or corymbs.

KEY TO THE SPECIES

Calyx lobes rounded; inflorescence racemose, secund; lower surface of leaf blades inconspicuously pubescent ..... **1. T. gigantea.**
Calyx lobes acute; inflorescence corymbose; lower surface of leaf blades conspicuously pubescent ..... **2. T. corymbosa.**

1. TRICHANTHERA GIGANTEA (Humb. & Bonpl.) Nees in DC. Prodr. 11: 218. 1847.

Ruellia gigantea Humb. & Bonpl. Pl. Aequin. 2: 68. pl. 102. 1807.
Trixanthera angularis Raf. Fl. Tellur. 146. 1838.

Shrub or tree up to 5 meters high (sometimes bushy and bearing adventitious roots); top round; twigs quadrate, the angles rounded, the tips minutely brown-tomentose; lenticels prominent, round, about 1 mm. in diameter; petioles 1 to 5 cm. long, channeled, glabrous or minutely pubescent; leaf blades ovate to oblong, the largest seen 26 cm. long and 14 cm. broad, acuminate at apex, narrowed at base, entire or undulate, glabrous except the veins and midrib, these prominent and more or less pubescent; inflorescence a terminal campact, secund panicle 5 to 15 cm. long and 4 to 5 cm. broad, brown-tomentose; bracts triangular, 3 mm. long; calyx 10 to 12 mm. long, brown-tomentose, the lobes erect, oblong, 7 to 10 mm. long, 5 mm. broad, rounded at apex; corolla 3 to 4 cm. long, red and glabrous proximally, yellowish and silky tomentose distally, red and glabrous within, the tube 1 to 1.5 cm. long, 6 mm. broad, sometimes slightly swollen or curved, the throat campanulate, the limb 2 to 3 cm. broad, the lobes oblong to oblong-ovate, 10 mm. long, 3 to 5 mm. broad; stamens exserted, the filaments 3 to 3.5 mm. long, pilose below, glabrous above, the anthers 6 mm. long, 3 mm. broad, bluntly apiculate at apex, bearded along the sutures, the hairs white and about 2 mm. long; ovary tomentose, 8-ovuled; style 4 to 5 cm. long, glabrous; stigma 2-lobed, one lobe vestigial, the other subulate, 2 mm. long; capsule oblong, 1.5 to 2 cm. long, 0.5 cm. broad, obtuse at apex, silky pubescent with closely appressed hairs, retinacula 3 mm. long, curved, truncate and erose at tip; mature seeds 1 to 4 in each capsule, lenticular, glabrous, 3 to 4 mm. in diameter.

Type locality: "In sylvis fluvii magdalenae prope Badillas," Colombia.

Specimens examined:

[2] H. B. K. Nov. Gen. & Sp. 2: 243. 1817.

Fig. 1.—*Trichanthera gigantea.* In cultivation at Bucaramanga, Colombia. (Killip and Smith 15452.)

COSTA RICA: Moist forest of Tilarán, Province of Guanacaste, alt. 500 to 650 meters, *Standley and Valerio* 46569 (N).[4] Dry forests of Nicoya, *Tonduz* in 1900 (N).

[4] N = U. S. National Museum; Y = Herbarium of the New York Botanical Garden; G = Gray Herbarium.

PANAMA: Vicinity of Gatuncillo, Canal Zone, *Piper* 5606 (N). Along the Sambú River, southern Darien, above tide limit, *Pittier* 5541 (N, Y). Forests around Pinogana, southern Darien, *Pittier* 6544 (N, G). Wet forest, Río Tapia, Province of Panamá, *Standley* 26149 (N), 30662 (N). Juan Diaz, Province of Panamá *Standley* 30542 (N). Narraganti, *Williams* 1007 (N, Y).

COLOMBIA: *Lehmann* 3040 (N). Antioquia: vicinity of Medellín, *Toro* 78 (Y). Fredonia, *Archer* 523 (N). Bolívar: Open forest, Sahagun, alt. 150 to 200 meters, *Pennell* 4101 (N, G, Y), San Martín de Loba, Lands of Loba, *Curran* 54 (N). Tolima: Ibagué, *Holton* in 1853 (Y). Santander: In yard, Bucaramanga, alt. 1000 meters, *Killip and Smith* 15452 (N). Dry hillside, Río Suratá valley, between El Jaboncillo and Suratá, alt. 1,500 to 1,800 meters, *Killip and Smith* 16426 (N). Norte de Santander: Roadside thicket, Culagá Valley, near Tapatá, alt. 1,500 to 2,100 meters, *Killip and Smith* 20504 (N, Y); Western side of Culagá Valley, alt. 1,480 to 1,550 meters, *Killip and Smith* 20534 (N, G, Y). In open along trail between Chinácota and La Esmeralda, alt. 1,000 to 1,300 meters, *Killip and Smith* 20891 (N). Cundinamarca: El Colegio, *Ariste-Joseph* 1061 (N); Between La Mesa and Magdalena, Bogotá, alt. 600 to 1,400 meters, *Triana* in 1851–57 (N, Y). El Valle: Thicket, "La Manuelita," Palmira, alt. 1,090 to 1,110 meters, *Pennell and Killip* 6193 (Y).

VENEZUELA: Between Valera and Monte Carmelo, Trujillo, alt. 535 to 1,830 meters, *Bellard* in 1923 (N). Near Río Cito, *Mell* in 1923 (Y). In hedge, Paso de Guanare, Portuguesa, *Pittier* 3951 (N, Y).

ECUADOR: Provincia Manabi, *Eggers* 14823 (N).

PERU: Near Tarapoto, Dept. of San Martín, *Spruce* 3951 (G).

As in the case of many attractive plants this species bears several common names. In Costa Rica and Panama it is known as "palo de agua;" in Venezuela, "naranjillo;" in Colombia, "aro-blanco" and "rompebarringa."

TRICHANTHERA GIGANTEA GUIANENSIS Gleason, Bull. Torrey Club **54**: 617. 1927.

Inflorescence 3 to 8 cm. long, 2 to 3 cm. broad; corolla 3 to 4 cm. long, yellow and scarlet; filaments pilose throughout.

BRITISH GUIANA: Anabisi River, Northwest District, *De La Cruz* 1348 (N, Y). Canaan, Demerara River, *Jenman* 5356 (Y). Barina River, *Jenman* 7037 (Y).

SURINAM: Paramaribo, *Reyne* in 1922 (N).

BRAZIL: Pará: Breves, *Killip and Smith* 30230 (N, Y).

Reyne found this tree planted as a windbreak in Surinam, where it is called "watra-hoedoe." It differs from the typical form in much smaller inflorescence and in the filaments being pilose throughout.

2. **Trichanthera corymbosa** Leonard, sp. nov.

Tree up to 3 m. high; twigs quadrangular, brownish tomentose, becoming gray and glabrous with age, the angles rounded, the nodes somewhat swollen, the lenticels prominent, round, about 0.5 mm. in diameter; petioles 1 to 5 cm. long, brown-tomentose; leaf blades ovate, 10 to 22 cm. long, 5 to 15 cm. broad, acuminate, blunt at tip, rounded at base or abruptly narrowed and slightly decurrent on the petiole, somewhat oblique, firm, shallowly crenate, the upper surface bearing numerous cystoliths and a few scattered hairs, the

lower surface tomentose, the veins (about 10 pairs) and midrib prominent and strongly tomentose; inflorescence corymbose, 10 to 20 cm. broad, the branches subquadrate and minutely brown-tomentose, the lenticels prominent; bracts small, leaflike, deciduous, those subtending the flowers triangular, 2 to 3 mm. long, 1 to 2 mm. broad; pedicel 2 to 5 mm. long, velvety brown-tomentose; calyx irregular (anterior lobe appreciably longer then the others), 1.5 to 2.5 cm. long, velvety brown-tomentose, the lobes oblong, 10 to 20 mm. long, 3 to 5 mm. broad, obtuse or acute, 5-nerved, the middle nerve more pronounced than the 4 lateral ones; corolla 3 cm. long, the tube 5 to 6 mm. broad, glabrous, the throat and lobes whitish or brown and densely tomentose without, purple and sparingly pubescent within, the limb 2.5 cm. broad, the lobes erect or spreading, ovate, 12 mm. long, 8 to 10 mm. broad, obtuse; stamens 4, in pairs, which are inserted on the upper portion of the corolla tube, exserted, the filaments 15 mm. long, united at base, the united portion 5 to 6 mm. long and pilose, the free portions glabrous; anthers 7 mm. long, 2 mm. broad, the lobes 2 to 3 mm. long, obtuse, sparingly pilose along the sutures; ovary densely yellowish tomentose, 8-ovuled; style 3 to 4 cm. long, pilosulous below, glabrous above, stigma 2-parted, one lobe rudimentary, the other subulate, about 4 mm. long, usually curved at tip; capsule oblong, 1.5 to 2 cm. long, 5 to 7 mm. broad, acute or obtuse at apex, densely tomentose with brownish, more or less spreading hairs; mature seed not seen but probably glabrous and lenticular.

Type in the U. S. National Herbarium, no. 1,355,268, collected in the Culagá Valley, near Tapatá, Dept. Norte de Santander, Colombia, altitude 1500 to 2100 meters, March 4, 1927, by E. P. Killip and Albert C. Smith (no. 20140). Also deposited in the Gray Herbarium and herbarium of the New York Botanical Garden.

Additional specimens examined:

VENEZUELA: Vicinity of Tovar, Mérida, along the Río Macoties, alt. 900 meters, *Pittier* 12828 (N, Y).

This species is very distinct and easily recognized by the cordate leaf blades which are densely brown-tomentose on the lower surface, the unequal calyx lobes with narrow, pointed tips, and the loosely-flowered corymbose inflorescence.

ENTOMOLOGY.—*New Coccinellidae from the West Indies.*[1]

EDWARD A. CHAPIN, Bureau of Entomology, United States Department of Agriculture. (Communicated by HAROLD MORRISON.)

The material described below has been received from several sources but by far the most important part has come for study and description from Mr. S. C. BRUNER, of the Estacion Experimental Agronómica de Cuba, at Santiago de las Vegas. In studying Mr. Bruner's *Scymnillodes* it was found necessary to work over all specimens of that genus from the West Indies. Unfortunately, there is at hand no material

[1] Received September 17, 1930.

from Jamaica, from which island there have been described three species. This has prevented a monographic treatment of the genus.

Geodimmockius, new genus[2]

Head prognathous; front slightly convex; epistoma not covering and not conspicuously raised above labrum; labrum transverse; antenna long, reaching to base of pronotum, inserted near eye at side of front, base free, ten-segmented, first segment the largest, somewhat bent, second as broad as first and little more than half as long, third about half as broad and slightly longer than second, fourth similar to third but slightly shorter, fifth, sixth and seventh of equal length, each slightly shorter than fourth, sixth and seventh noticeably wider than fifth, eighth to tenth forming a fusiform club, ninth and tenth of equal length; mandible with apex undivided, subapical tooth large and prominent, ventral submedian tooth obsolete, dorsal submedian tooth reduced to a small knob, median notch on inner edge large, deep, quadrate; inner margin of mandible above notch cut away; maxilla with three-segmented palpus, apical segment very large, hatchet-shaped, second segment not prolonged at inner apical angle, galea and lacinia each with a cluster of long setae at tips; labium poorly chitinized, quadrate, with a few long setae on external surface, internal surface closely studded with short spines, apical segment of palpus conical, slightly attenuate near tip which is squarely truncate, mentum trapezoidal, broadest in front, bearing eight long setae, submentum very short and transverse. Pronotum moderately convex, transverse, lateral margins broadly explanate, not excavate below for reception of antennae, prosternum moderate, not concealing trophi, tumid, median paired carinae absent. Mesosternum with the median, anterior, crescent-shaped portion deeply sunk and bounded behind by a prominent arcuate carina, intercoxal portion trapezoidal, mesepisternum feebly chitinized and not well defined as to limits, mesepimeron roughly triangular, its inner point reaching and partially bounding coxal cavity. Metasternum broad, anterior lateral portions separated from posterior portion by a prominent transverse carina which is broken at median line, metepisternum not chitinized, metepimeron long and narrow, not excavate for reception of part of leg II. Elytron with epipleura horizontal, lateral margin strongly explanate, epipleura not excavate for reception of legs. Wing venation reduced, only costal, cubitus and fourth median veins visible. Legs essentially similar, femora not notably expanded, tibiae slender, parallel-sided, without grooves for reception of tarsi, without apical spurs but with the usual row of apical setae, tarsi four-segmented, third segment small and inconspicuous, claw with prominent basal tooth. Abdomen with sternites III–VIII visible, metacoxal arcs short and incomplete.

Genotype.—Geodimmockius explanatus, new species

This genus is closely allied in structure, though not in appearance, to the following West Indian genera: *Psorolyma* Sicard, *Bura* Mulsant, *Botynella* Weise, all of which the writer has been able to dissect and study. This well defined group shares the following characters: four-segmented tarsi, tarsal claws toothed at base, tibial spurs absent, mandible with subapical tooth

[2] To George Dimmock (1852–1930) for his extensive investigations in entomology and especially for his *Algunas Coccinellidae de Cuba*, Primer Informe Annual de la Estacion Central Agronómica de Cuba, pp. 287–392, June 1, 1906.

large and remote from apex and with median quadrate notch, antennae ten-segmented with three-segmented fusiform club, metacoxal arcs incomplete.

The following key, based on external characters only, will serve to separate the species of these genera which are known to me.

1. Body strongly convex, outline from above nearly circular.....2
   Body not strongly convex, outline from above elongate.....3
2. Length 2.8 mm., bronze with metallic luster, epipleurae descending externally, lateral margin of pronotum not explanate..**Bura cuprea** Muls.
   Length 1.7 mm., head, thorax and humeri black, elytra light castaneous, epipleurae horizontal, lateral margins of pronotum explanate **Geodimmockius explanatus,** new species.
3. Length 2.0–2.5 mm., metallic blue above, epistoma of male produced in two multiangulate lateral processes.....**Psorolyma maxillosa** Sic.
   Length 1.8–2.0 mm., testaceous spotted with black, epistoma not produced in either sex. (*Botynella*).....4
4. Elytra with a median spot common to both.....**Botynella 5-punctata** Ws.
   Elytra without sutural spot.....**Botynella 4-punctata** Ws.

Geodimmockius explanatus, new species

Nearly circular, strongly convex, lateral margins of pronotum and elytra with broad, transparent, testaceous, explanate margins; head, last three segments of antenna, pronotum, humeri and under surface of body black, elytra (except humeri) castaneous, basal segments of antenna, trophi and legs testaceous. Head finely sparsely punctured, eyes convex and prominent, labrum nearly quadrate; pronotum convex, more coarsely and much more densely punctured than head, twice as broad as long (by measurement), elytra with punctation similar to that of pronotum, greatest width at basal third where their combined width is one and one-half times that of pronotum; under parts finely alutaceous, very finely and sparsely punctured; legs moderately long, not received in cavities beneath body. Length: 1.7 mm., width: 1.5 mm., altitude: 0.85 mm.

Type and *paratypes.*—Cat. No. 43129, U. S. N. M.

Type a male, paratypes two females, all from S. Nicolas, Oriente Prov., Cuba, July 20–27, 1927, S. C. Bruner, collector, taken on *Coffea arabica,* E. E. A. de Cuba, No. 9338. One paratype, female, same data, in collection of S. C. Bruner. One paratype, female, same data, in collection of the British Museum.

Scymnillodes bruneri, new species

Oval, convex, shining, brassy with rose-red reflections, under parts black. Head with reflexed epistoma, front sparsely and moderately coarsely punctured, sparsely hairy. Antennae brownish, palpi and mandibles black. Pronotum about twice as broad as long (length-width ratio = 20:39), marginal bead very fine, sides rather broadly and strongly reflexed. Punctation extremely fine, hardly visible under magnification of 64×. Elytra punctured like pronotum, lateral margin beaded and slightly reflexed, basal and sutural margins not beaded. Epipleurae with very slight excavations for legs, broad before middle, disappearing shortly behind middle. Prosternum and mesosternum with a few very coarse punctures, metasternum sparsely and rather

finely punctured. First visible abdominal sternite very sparsely punctured outside of the strongly raised metacoxal area, areas enclosed by arcs strongly alutaceous and more finely and densely punctured. Second to fourth sternites alutaceous laterally, shining medianly, each with one complete transverse row of rather coarse punctures and with other punctures near lateral margins. Legs and tarsi black. Length: 1.5 mm., width: 1 mm., altitude: 0.7 mm.

Type.—Cat. No. 43130, U. S. N. M., from Santiago de las Vegas, Cuba, April 1, 1930, S. C. Bruner, collector. Paratype, same place, April 8, 1930, S. C. Bruner, collector, in collection of S. C. Bruner.

Easily separated from the other species of the genus by the black legs and almost invisible punctation of the pronotum and elytra.

Scymnillodes iris, new species

Oval, convex, shining, head bluish green, pronotum brassy-green, elytra rosy purple margined with brassy green, all parts with strong metallic reflections, under parts black. Head with reflexed epistoma, front moderately densely set with deep and distinct punctures, sparsely but rather conspicuously clothed with white hairs. Antennae not noticeably paler than palpi or mandibles. Pronotum twice as wide as long, marginal bead strong, side margins narrowly but sharply reflexed. Punctation of pronotum finer and slightly denser than that of head, pubescence not evident. Elytra with punctures of two sizes; however, the difference in the sizes is not so well marked as in *S. splendidus*. The density of punctation is about the same on pronotum and elytra. Marginal bead fine, noticeable both on lateral and sutural margins, basal margin not beaded. Epipleurae without defined excavations for reception of legs, broad anteriorly, rapidly disappearing behind. Prosternum very coarsely punctured, meso- and metasternum less coarsely and rather sparsely punctured. First abdominal sternite sparsely but coarsely punctured, other sternites as in *S. splendidus*. Legs and tarsi black. Length: 1.5 mm., width: 1.1 mm., altitude: 0.7 mm.

Type.—Cat. No. 43131, U. S. N. M. from Havana, Cuba, W. M. Mann, collector.

Scymnillodes splendidus, new species

Broadly oval, strongly convex, shining, greenish-blue to purplish blue, luster strongly metallic, under parts black. Head strongly and moderately densely punctured, very inconspicuously hairy, epistoma strongly margined. Antennae brownish, palpi and mandibles black. Pronotum more than twice as broad as long (length-width ratio = 14:30), marginal bead complete, punctures of uniform size, rather coarse and not densely placed. Scutellum small, triangular, impunctate. Elytra with mixed punctation of large and small punctures, the large punctures and also the punctures of the pronotum umbilicate. Lateral marginal bead very strong, basal and sutural margins not beaded. Epipleurae broad basally, excavate for reception of middle and hind legs but not sharply so, narrowing rapidly behind middle and disappearing in the latitude of the second visible abdominal segment. Prosternum and mesosternum very coarsely and closely punctured, metasternum less coarsely and quite sparsely punctured, especially in the median area. First visible abdominal sternite very sparsely punctured outside of the strongly raised metacoxal arcs, areas enclosed by arcs strongly alutaceous and more finely

and densely punctured. Second to fourth sternites alutaceous laterally, shining medianly, each with one complete transverse row of rather coarse punctures and with other punctures near lateral margins. Fifth sternite broadly rounded behind, slightly tumid in female, flat in male, evenly and rather coarsely punctured. Legs black, tarsi slightly paler. Length: 1.6–1.8 mm., width: 1.3–1.4 mm., altitude: 0.90–0.96 mm.

Types and *paratypes.*—Cat. No. 43132, U. S. N. M.

Types and two paratypes from Baragua, 8.3.27, on citrus, L. C. Scaramuzza, collector, T. P. R. F. No. 3237; eight paratypes from Guantanamo, 1918, W. M. Mann; one paratype from Cayamas, 8.6., E. A. Schwarz; one paratype from Central Jaronu, Aug. 10, C. F. Stahl, T. P. R. F. No. 2246; six paratypes from Paso Estancia, May 2, 1916, preying on *Lepidosaphes* sp.; six paratypes from Santiago de las Vegas, April 3, 1930, S. C. Bruner, E. E. A. de Cuba No. 9325; two paratypes from same place, Feb. 18, 1930, P. A. Berry, on *Aleurocanthus woglumi* Ashby; three paratypes from same place, July 14, 1930, S. C. Bruner; one paratype from near Santiago de Cuba, Oct. 4, 1928, Silvestri and Bruner; six paratypes from Camaguey, July 19, 1923, J. Acuña; four paratypes from Isle of Pines, on grapefruit, intercepted at Cincinnati, Ohio, U. S. A. by R. S. McKay. Paratypes in the collection of S. C. Bruner: one from Santiago de las Vegas, Feb. 18, 1930, P. A. Berry; one from same place, April 8, 1930, S. C. Bruner; one from Paso Estancia, May 2, 1916; one from Guantanamo, 1918, W. M. Mann; one from Camaguey, July 19, 1923, J. Acuña. Paratypes in collection of the British Museum: one from Santiago de las Vegas, Feb. 18, 1930, P. A. Berry; one from Paso Estancia, May 2, 1916.

The Santiago de las Vegas, Santiago de Cuba, and Isle of Pines specimens differ from the others in that the elytra are sharply bicolored, the lateral margins being deep blue while the discal areas are greenish. In a few the suture is also blue. I have been unable to find the slightest structural difference between specimens of these forms.

Scymnillodes caseyi, new name

1924. *Delphastus violaceus* Casey, Memoirs Coleoptera, 11: 170, nec *Scymnillodes cyanescens*? var. *violaceus* Sicard, 1922.

This species was based on one of a series of specimens taken at Cayamas, Cuba, by the late E. A. Schwarz. Judging from the eight specimens in the Museum collection, Casey's type was not fully colored at the time of its capture and for this reason only the posterior femora are dark. In what appear to be fully colored specimens all femora are nearly black, the pale yellowish tibiae in striking contrast with them. In addition to the Schwarz specimens from Cayamas there are in the collection one specimen from Cayamas collected by George Dimmock, one from Simpatia, Cuba, by W. M. Mann, two from Cabada, Cuba, by W. M. Mann, and two from Maricao, Porto Rico, July 2, 1917, by Harold Morrison (his number A-289).

The Dimmock specimen noted above was recorded in his "Algunas Coccinellidae de Cuba" as *Bura* sp.

Scymnillodes gilvifrons, new species

Oval, convex, shining, head metallic greenish, pronotum and elytra metallic violaceous, front of head and anterior angles of pronotum densely set with golden pubescence, under parts black, appendages yellowish to reddish testaceous. Head with epistoma hardly reflexed, punctation moderately dense and coarse but somewhat obscured by the pubescence. Mandibles castaneous, darker than labrum, antennae or palpi. Pronotum twice as wide as long, marginal bead strong at sides and across base, complete but fine across front margin, side margins narrowly but sharply reflexed. Punctation less dense but equally coarse to that of head, pubescence restricted to anterior angles. Elytra coarsely, sparsely and irregularly punctured, fine punctures absent. Marginal bead fine, present only on lateral margins. Epipleurae without defined excavations for legs, rather narrow from base to end of first abdominal sternite, rapidly disappearing behind. Prosternum with a few very coarse punctures covering most of the surface, meso- and metasternum more sparsely punctured, the latter punctured only at sides and along median line. Abdominal sternites strongly alutaceous at sides, sparsely and rather finely punctured. Legs and tarsi reddish testaceous. Length: 1.5 mm., width: 1.1 mm., altitude: 0.8 mm.

Type and three *paratypes.*—Cat. No. 43133, U. S. N. M., from Maricao, Porto Rico, July 2, 1917, H. Morrison, collector, original number A-289.

Easily recognized by the brilliant yellow pubescence on head and pronotum.

Scymnillodes subtropicus Casey

1924. *Delphastus subtropicus* Casey, Memoirs Coleoptera, 11: 170.

Five specimens of this species from Key West, Florida, and one from Biscayne, Florida, are in the Museum collection. The Biscayne specimen is rather more violaceous in color than the Key West series but in structure and punctation there appear to be no differences. A true *Scymnillodes* and the only species of this genus to be reported from the mainland of the Americas.

Scymnillodes atrox, new species

Oval, convex, shining, black, head with a greenish metallic luster, pronotum with bluish metallic luster, appendages reddish testaceous. Head with epistoma slightly reflexed, front rather sparsely and finely punctured, sparsely pubescent with pale whitish hairs. Pronotum very slightly more than twice as broad as long (length-width ratio = 19:40), marginal bead fine, side margins very narrowly reflexed. Punctation of pronotum same as that of head, pubescence not evident. Elytra rather less densely punctured than pronotum, punctures of a uniform size which is slightly larger than those of pronotum. Marginal bead fine, noticeable both on lateral and sutural margins. Epipleurae not foveolate, moderate in width, rapidly disappearing behind level of first abdominal sternite. Prosternum coarsely but obsoletely punctured, mesosternum rather densely set with large ill-defined punctures, metasternum very sparsely and rather finely punctured. Abdominal sternites alutaceous laterally, sparsely and finely punctured, the second to fourth with the usual single transverse row of punctures. Legs and tarsi reddish testaceous. Length: 1.4 mm., width: 1.0 mm., altitude: 0.7 mm.

Type.—Cat. No. 43134, U. S. N. M., from Camp Herrin, La Prise, Haiti, July 26, 1925, W. A. Hoffman, collector.

The various species of *Scymnillodes* known to me may be separated one from another by the following table. It is impossible to place the Sicard species with any degree of certainty as the original descriptions are rather incomplete as regards the structural characters. Color and size alone are not sufficient to define species in this genus.

1. Legs black.....2
   Legs, at least in part, pale.....4
2. Elytra impunctate.....**S. bruneri,** new species
   Elytra conspicuously punctured.....3
3. Elytral punctures nearly uniform in size; length 1.5 mm.
   S. iris, new species
   Elytral punctures of two conspicuously different sizes; length, 1.6–1.8 mm.....**S. splendidus,** new species
4. Apices of femora, tibiae and tarsi paler (usually very distinctly so) than remainder of femora; second abdominal sternite with two irregular transverse rows of punctures.....**S. caseyi,** new name
   Legs entirely uniformly pale; second sternite with a single regular transverse row of punctures.....5
5. Anterior angles of pronotum and front of head thickly set with golden pubescence.....**S. gilvifrons,** new species
   Anterior angles very sparsely pubescent.....6
6. Above bluish-black, beneath pale, intercoxal process of first abdominal very sparsely and irregularly punctured.....**S. subtropicus** Casey
   Above deep black, beneath deep brownish black, intercoxal process rather sparsely but quite regularly punctured.....**S. atrox,** new species

Diomus bruneri, new species

Form elongate, sides parallel; varying in coloration from piceous-black with head, trophi and antennae, anterior and side margins of pronotum, and two large spots on each elytron and legs pale to entirely pale except for the first two abdominal sternites which are castaneous. Head sparsely and finely but distinctly punctured, sparsely pubescent. Pronotum much broader than long (length-width ratio = 28:48), lateral margins gently and evenly curved, anterior angles directed downward, anterior margin rather strongly convex so that the head is almost entirely concealed from above by the pronotum, lateral and basal margins finely beaded, surface sparsely and very finely punctured, sparsely set with decumbent pubescence. Elytra more strongly punctured than pronotum, pubescence similar to that of pronotum, lateral marginal bead very fine, epipleura narrow at base and disappearing at a point anterior to insertion of posterior coxae, piceous black bimaculate with stramineous in fully colored specimens. The anterior spot is large and roughly quadrate, occupying all of the anterior three-fifths of the elytron except the narrow basal, lateral and sutural margins. The posterior spot is irregular in shape and is usually connected with the anterior spot by a small isthmus of pale color at the sutural third of the width of the elytron. In its anterior half the spot fails to reach either suture or lateral margins, in its posterior half it suddenly widens to include all of the tip of the elytron. In pale specimens the dark color is completely absent. The prosternum between coxae is flat, apparently devoid of punctures, and is bordered by the usual carinae. The remaining under parts are finely and rather sparsely punctured and sparsely pubescent.

The abdomen becomes somewhat paler toward the apex. The fifth visible sternite is broadly emarginate in the male, normal in the female. Length: 1.7–2.0 mm., width: 0.96–1.1 mm., altitude: 0.72–0.80 mm.

Type and *paratypes.*—Cat. No. 43168 U. S. N. M.

Type and thirteen paratypes from Cayamas, various dates from December to June, E. A. Schwarz; two paratypes from Est. Cent. Agr. de Cuba, June 2, 1916; one paratype from Havana, C. F. Baker; four paratypes from Baraqua, July to October, L. C. Scaramuzza, T. P. R. F. No. 3222; one paratype from Santiago de las Vegas, July 14, 1930, S. C. Bruner; one paratype from Hoyo Colorado, Havana, D. W. Jones and S. C. Bruner, E. E. A. de Cuba, No. 9347; one paratype from Sierra Rangel, August 28, 1929, J. Acuña and S. C. Bruner; one paratype from Nagua, Oriente Prov., July 7, 1922, S. C. Bruner and C. H. Ballou.

In the collection of S. C. Bruner—two paratypes from Cayamas, E. A. Schwarz, and one paratype from Hoyo Colorado, Havana, E. E. A. de Cuba, No. 9347. In the collection of the British Museum—two paratypes from Cayamas, E. A. Schwarz.

Superficially resembles *Diomus quadritaeniatus* Lec. from Florida but is larger, much more finely punctured and with the pronotum less broad proportionately.

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES

ENTOMOLOGICAL SOCIETY

419TH MEETING

The 419th regular meeting of the Entomological Society of Washington was held at 8 p.m., Thursday, April 3, 1930, in the U. S. National Museum. F. C. BISHOPP presided. Remarks were made by Doctor MORRISON, the chairman of the program committee, Prof. E. N. CORY and Doctor HOWARD regarding a proposed meeting of our Society on the grounds of the University of Maryland at College Park, Maryland, the first Thursday afternoon and evening June 5 next, at which it was proposed to have opportunity for insect collecting, and an informal basket supper, followed by an open air meeting. On vote of the Society, this program was accepted with pleasure and thanks were extended to Professor CORY and his colleagues for the invitation.

Program: J. M. ALDRICH gave some informal reminiscences of early years in Dipterology, with special emphasis on his own personal acquaintance with the personnel of its growth and development in this country. He apologized for dealing with the subject in such a personal way as he had no desire to appear egotistical or to appear to put himself unduly forward in the matter, but he considered that such a presentation from the standpoint of an individual could be made a much more vivid and colorful narrative. Doctor Aldrich stated that he was born at Rochester, Olmsted Co., in Minnesota in 1866, where he spent his childhood. Parenthetically he added that at that time Rochester was an obscure village but is known now all over the world because of the famous medical and surgical institution there. In 1881, at the age of 15, his people moved to eastern South Dakota, near the Minnesota

state border. He had a very brief high school career in 1884 and 1885 and later attended the State Agricultural College at Brookings, South Dakota, where he worked his own way through school. It was a new school in a new country, and began on a very small scale. However most of the student body were working their way and eager to learn, while the faculty was composed of friendly and helpful people; the speaker received in three years of this kind of atmosphere an intellectual impetus which is not always imparted in the largest universities. He did not however receive any important body of facts to carry away. His progress through the institution was accelerated by the desire of the President to have a graduating class in 1888, as a result of which he received his degree in three years. Entomology first came within his ken in the last term of college, when a course was given by Prof. I. H. Orcutt, a medical doctor who had been put on the faculty and given a large field in biology. The worthy doctor had never studied entomology himself, but he was wise enough to turn the students loose with the insects, and the speaker made a considerable collection and enjoyed the course immensely, but without the least thought that he might continue the subject, still less find his life work in it.

After graduating, still at sea in regard to his next move, he, like a number of the other students, decided to canvass for a book to get a little ready money. Three days of this was enough to convince the speaker that he was not made for a book agent, and he went back to his father's farm to assist in the harvest. A few days later, while shocking up wheat, the idea crossed his mind that Professor Orcutt, who had become entomologist of the newly-established Agricultural Experiment Station in addition to his teaching duties, really needed an assistant, and that an opening here might lead to an attractive field of activity. So he wrote to Doctor Orcutt, who consulted the President and wrote back that young Aldrich should study entomology through the winter, and in the spring they would see what could be done. With this much encouragement the young man taught a term of school to get a little money, and in late fall made his way to the University of Minnesota to take up entomology again. This university then had about 500 students, ranking well in size among the western institutions. President Cyrus Northrup, after the manner of the time, interviewed all the new students personally; he said they had no courses in entomology, but out at the Experiment Station at St. Anthony Park they had a very able entomologist, Otto Lugger, who would perhaps give a student private instruction during the winter. So Aldrich went out to St. Anthony Park armed with a letter from the President, and was readily accepted as a student by Lugger. Arrangements were made to eat at the new School of Agriculture nearby, and sleeping accommodations were found in a cold room used by laborers in summer. Lugger originally was a German coleopterist and had a fine collection well mounted; he had been employed by Riley in Missouri, and after some years had been in the Division of Entomology staff in Washington for a short time before coming to Minnesota a year or two before 1888. The winter's work leaned rather heavily on Leconte and Horn's "Classification of the Coleoptera of North America," but the student could not fail to absorb some of the enthusiasm of the teacher, who was a born naturalist. In the spring, after considerable delay, the young aspirant was given a three months' engagement at the Agricultural College at Brookings, at $40 a month. In the fall he was put on the staff with an annual appointment at $500, with the understanding that he would devote his winters to study.

Where to go to study entomology in the fall of 1889 was one of the first questions that arose, and was decided in favor of the Michigan Agricultural College; there was very little choice at that time, especially as the young student had not heard of Cornell University except in very vague terms. In November he started for Lansing, Mich., and spent the winter with a group of ten young men who, under Prof. A. J. Cook, were doing what was then believed to be advanced work in entomology. Among the group were A. B. Cordley and F. J. Niswander, assistants to Professor Cook; Chas. B. Cook, nephew of the professor; Victor Lowe, later at the Geneva Experiment Station; H. E. Weed, Gager C. Davis, and C. F. Baker, who was still an undergraduate. Professor Cook was described by the speaker as an excellent teacher and a keen and practical man of affairs, with tremendous energy. He advised young Aldrich to select a single order as a specialty, and to proceed at once to get together a library and collection; he also suggested the Diptera as a large order in which there were but two workers (Williston and Coquillett) at the time in the country. The advice was accepted, and the library and collection duly begun, in the spring of 1890. Aldrich became a subscriber of Entomological News before the second number of Volume 1 was issued. Williston sent him his separates, as did Coquillet and Osten Sacken, and he began buying at an alarming rate out of his small salary.

Returning to South Dakota for the year's work, he collected as many Diptera as possible, and arranged in the fall with Professor Hagen to spend the following winter at the Museum of Comparative Zoology at Harvard in a study of the Loew-Osten Sacken collection of Diptera, then the only one of any importance in the United States. In November he started east with this object in view, first stopping at Ames, Iowa, to become acquainted with Osborn and Gillette. He accompanied both of the entomologists to Champaign, Illinois, to attend a meeting of the recently organized Association of Economic Entomologists. Professor Osborn shared his sleeping-car berth en route with the impecunious student, a characteristic act of kindness never forgotten. At Champaign he met Riley, Howard, John B. Smith and others, and found that Professor Cook had already secured his election to the Association. Arriving at Harvard University, he was informed by the registrar, Frank Bolles, that Professor Hagen had suffered a stroke of paralysis and his department had been closed, making it impossible for anyone to study the collections. This was a severe blow, as it was hard to arrange any other plan for the winter without far exceeding the available funds of the student. In explaining his situation to the sympathetic registrar, he happened to allude to his graduation from the South Dakota Agricultural College; this had a remarkable effect, for Harvard University at that time was very ambitious to develop a strong graduate department, and any sort of a degree meant a great deal in a student. So Mr. Bolles began to plan to secure from Alexander Agassiz some concession which would permit Aldrich to remain. Following the directions of Bolles, he went to Agassiz's door expecting to see the eminent Director, but was kept waiting outside while a secretary went in and explained his broken plans. After a time she came back and opened the door sufficiently to say that Mr. Agassiz could do nothing about the matter. Mr. Bolles later interviewed Agassiz himself with no results, and a letter of explanation from Aldrich to Agassiz, suggested by Bolles, brought only a printed postal card denying the request.

Forced to abandon his winter's plans, he started for Washington to see the collections there, but on the way stopped at Brown University to see Professor

Packard, who was most friendly and hospitable, and took the young entomologist home to dinner, after which they spent the evening in the library, and Packard showed materials for future publications which he was preparing. It was the first glimpse into the field of real science, and made a profound impression on the westerner.

Arriving in Washington early one morning in late November, Aldrich waited for the opening of business and pawned his watch for $5, after which he ate breakfast and shortly made his way to the Division of Entomology. Doctor Howard took him in charge, suggested a place to stay and arranged about his work in the National Museum, where the collection of insects was under the direction of Martin Linell. The main part of the collection of Diptera was in the Syrphidae, where Williston's Syrphidae were deposited. With these and such other material as has been accumulated, Aldrich spent three profitable weeks. A meeting of the Entomological Society occurred in this period, which he attended on the invitation of Doctor Howard. It was in a private house, and the small room was soon so full of tobacco smoke that at the conclusion the visitor was obliged to seek fresh air, without sharing in the social hour which was then an outstanding feature. His money exhausted, Aldrich returned home and spent the remainder of the winter classifying his flies with the help of the library he had accumulated.

The following winter was spent at home, as his collections and library had then assumed enough importance to justify all the time he could spend upon them.

In the summer of 1892 he had his first real collecting trip, a small appropriation having been secured for a trip to the Black Hills lasting some three or four weeks. In the Hills he joined a party from the University of Nebraska, under the management of Professor Bruner. Among the members were Rydberg, White, A. F. Woods, and other students, as well as the Bruner family and several women and children.

Conditions in the college had become disturbed, owing to factional strife. Professor Orcutt had become involved as an opponent of the President. In November several removals from the faculty took place, and among those to go where Orcutt and Aldrich. It did not take a young dipterist of those days long to decide that the proper course lay in joining Williston in the University of Kansas; so about New Year's he arrived at Lawrence, where Williston received him with open arms and he spent the rest of the year adding a little other work to his main study of the Diptera. It was in the last of June, after the close of the college year, that he was appointed Professor of Biology in the University of Idaho, and he concluded his reminiscences at this point.

Summarizing his educational experiences, he noted that his four teachers, Orcutt, Lugger, Cook and Williston, formed a sort of ascending series, but each contributed an important element. He began his professorship in the new University of Idaho with pathetically inadequate preparation (never having seen an Amoeba, for instance). Fortunately the instruction for some years was elementary, and by diligent application he attained a fair degree of self-education;—"And after all," he concluded, "I do not know of any other kind of education." (*Author's abstract*).

This paper was discussed by Doctor HOWARD.

W. V. BALDUF: *Preliminary remarks on the habits and taxonomy of the chalcid genus* Decatoma *Spin.* This will be amplified and published later. Discussed by Doctor HOWARD.

E. A. CHAPIN: *Remarks on exotic Scarabaeidae imported into the United States.* Doctor Chapin gave a short discussion of a few of the Scarabaeidae which have been imported into the United States at various times. The species mentioned were *Onthophagus nuchicornis* L., *Aphodius rufipes* L., *Geotrupes stercorosus* Scriba, *Hybosorus illigeri* Reiche, *Autoserica castanea* Arr., *Serica similis* Lewis, *Plectris* sp. near *pexa* Germ., *Anomala dubia* Scopoli, *Anomala rufocuprea* Mots., *Anomala orientalis* Waterh., *Popillia japonica* Newm., and *Oxycetonia jucunda* Fald. Of these, all but two have been previously reported. *Plectris* sp. near *pexa* Germ. was taken at or near Charleston, S. C., July 1922. That year it appeared to be quite numerous. However, nothing has been seen of it since, according to Miss Laura Bragg of the Charleston Museum. *Anomala rufocuprea* Mots. is a Japanese species twice taken in this country. One specimen comes from Kent, Washington where it was collected by H. E. Burke, July 10, 1905. The other was taken in a greenhouse at the Demoto Nursery, Melrose, Calif., May 17, 1915 by E. O. Essig. In regard to the names of two of our imported pests, the speaker pointed out that no possible case for the retention of *Aserica* Lewis in place of *Autoserica* Brenske can be made which will not conflict with the International Code of Nomenclature. The case is fully covered in Opinion 14. The point at issue in the case of *Anomala orientalis* Waterh. is not one of nomenclature so much as one of zoology. The species was described in *Phyllopertha* where it obviously does not belong. Reitter's genus *Exomala* was proposed to care for this one species. It seems hardly necessary however, and its transfer to *Anomala* was made as early as 1887.

This paper was discussed by ROHWER, MORRISON, BISHOP, and HOWARD.

Miss COLCORD exhibited a copy of a mimeographed contribution just issued entitled "Check list of the publications on entomology issued by the United States Department of Agriculture through 1927, with subject index," by Mabel Colcord, Ina L. Hawes, and Angelina J. Carabelli, U. S. Dept. of Agriculture Library Bibliographical contribution No. 20, January, 1930.

420TH MEETING

The 420th regular meeting of the Entomological Society of Washington was held at 8 p.m. Monday, April 28, 1930, in the Assembly Hall of the Cosmos Club. The President, Mr. J. E. GRAF, presided.

Brief preliminary remarks were made by the President, introducing the speaker of the evening. He stated that the Society was called together on short notice at other than its regular meeting time, in order to give the personnel opportunity and pleasure of meeting and listening to an address by a distinguished visitor, Professor CARL VON FRISCH, Director of the Zoological Institute, University of Munich, Germany, who had been on a lecture tour throughout this country since March 11, and who would depart for New York the following day where he would lecture on Wednesday and Thursday at Columbia University and would sail for Europe on Friday.

Professor VON FRISCH thereupon addressed the Society on the subject of *The senses and language of the honeybee.* In this he first reviewed briefly the results of some experimental work performed by various workers from Sir John Lubbock to himself on the ability of bees to distinguish differences of color, and showed some of the mechanical equipment and methods used in his own work along that line. The first experiments were with blue, and later with purple, orange, green, and other colors. Later efforts were made to detect ability of bees to distinguish variations in closely related shades, especially in blossoms of plants, and on cardboards with and without sugar

baits. Attention also was given to experiments on underlying reasons why certain species of bees appear always to feed on the same species of flowers, and possible relation thereto of senses of taste and smell, and the ability to distinguish sweet, sour or bitter substances. Methods used to segregate by number, or otherwise to mark the individual bees for observation purposes, were shown. Moving pictures also were shown of various forms of dancing by bees and the possible significance was discussed. A considerable number of slides and motion picture reels were shown during the address.

This communication was discussed by McINDOO and BUSCK.

J. S. WADE, *Recording Secretary.*

SCIENTIFIC NOTES AND NEWS

Dr. CARLETON R. BALL, until recently principal agronomist in charge, Office of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture, and now engaged in agricultural writing, was elected national president of Gamma Sigma Delta, honor society of agriculture, at its recent annual meeting in St. Louis. He had been its vice-president for the past two years.

Prof. LAWRENCE M. GOULD of the University of Michigan, geologist of the Byrd Antarctic Expedition, delivered an illustrated lecture before the National Geographic Society November 14 on the subject *With Byrd to the bottom of the World.* On the afternoon of November 15 he spoke informally about the geology of Antarctica to a group of geologists at the Geological Survey.

Mr. MELBOURNE WARD, of the Australian Museum, is spending a few weeks examining crustacea at the National Museum. On November 15 he gave an illustrated lecture before the Biological Society on *The natural history of the barrier reef of Australia.*